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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,769	02/05/2004	Andrzej Kaszuba	8306/DSM/BCVD/JW	9333

44182 7590 02/23/2007
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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/775,769

Applicant(s)

KASZUBA ET AL.

Examiner

Rakesh K. Dhingra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/27/06 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1-7, 21 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended independent claims 1 and 21 by adding new limitations "that slopes" and "into sealing contact with".

New references have been found (US Patent No. 5,508,519 – Bennett et al, US Patent No. 3,951,478 – Olsen et al and US Patent No. 5,873,177 – Honda et al) that when combined read on limitations of amended claim 1. Accordingly claim 1 has been rejected under 35 USC 103 (a) as explained below. Independent claim 21 has also been rejected under 35 USC 103 (a) as being unpatentable over Bennett et al in view of Honda et al as explained below.

Further, remaining dependent claims 2-7 have also been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter

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sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (US Patent No. 5,508,519) in view of Olsen et al (US Patent No. 3,951,478) and Honda et al (US Patent No. 5,873,177).

Regarding Claim 1: Bennett et al teach a semiconductor processing apparatus (Figures 1-3) comprising:

- a chamber body (target chamber 1) having an aperture formed in a bottom of the chamber body;
- a platen 9 (substrate support) disposed in the chamber body;
- a moveable shaft 7 coupled to the substrate support (platen 9), the movable shaft extending through the aperture;
- a seal 21 (like an annular guard ring) having a portion that slopes radially inward and upwards into sealing contact with the shaft 7 (column 2, line 42 to column 3, line 45).

Bennett et al do not teach a step formed in the inner surface of the aperture and annular guard ring positioned within the step.

Olsen et al teach an apparatus (Figures 1-3) comprising a housing 12 for a shaft 14 and seal 16 that is mounted in a stepped space in housing 12 (like an aperture), and has ribs 42 that slope radially inwards and upwards into sealing contact with the shaft 14 (Figure 3 and column 2, line 25 to column 3, line 50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to mount the annular guard ring (seal) in a step in aperture as taught by Olsen et al in the apparatus of Bennett et al to provide proper sealing for either linear or rotary motion of the shaft with enhanced free turning capability.

Bennett et al in view of Olsen et al do not explicitly teach a step formed in the bottom aperture of the process chamber. However this is a matter of choice (as per example given below) depending upon how the guard ring is mounted at the bottom of the chamber, and other process related factors like desired level of particle control and space availability for the seal mounting structure.

Honda et al teach a semiconductor processing apparatus (Figure 5) comprising:

a treating vessel 30 (chamber body) having an aperture formed in a bottom of the chamber body;

a rotor 2 (substrate support) disposed in the chamber body;

a moveable shaft 3 coupled to the substrate support, the moveable shaft extending through the aperture;

a step formed in an inner surface of the aperture; and

a sealing mechanism (like an annular guard ring) comprising of sealing cover 7, sealing cylindrical body 7b and bearings 7a positioned within the step, the guard ring having a portion extending that slopes radially inward and upwards into contact with the shaft 3 (through bearing 7a) [column 8, lines 10-20]. Further, aperture having a step with the guard ring positioned in the step is related to shape, which is a matter of choice and would depend upon process limitations like control of particles desired.

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to form shape of chamber bottom aperture as having a step, and with an annular guard ring disposed in the step, as taught by Honda et al in the apparatus of Bennett et al in view of Olsen et al to prevent particles on the shaft from reaching near the substrate and thus improve the yield (column 2, lines 30-35 and column 5, lines 5-10).

In this connection, courts have ruled (Case law):

Regarding change in shape: It was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (US Patent No. 5,508,519) in view of Olsen et al (US Patent No. 3,951,478) and Honda et al (US Patent No. 5,873,177) as applied to claim 1 and further in view of Forster et al (US Patent No. 5,273,588).

Regarding Claim 2: Bennett et al in view of Olsen et al teach all limitations of the claim except the step comprises a lip formed in the step adapted to retain the guard ring within the step.

Forster et al teach a semiconductor processing chamber (Figures 2, 4) comprising:
a chamber body 26 having a hole (aperture) 51 formed in a bottom of the chamber body;
a susceptor (substrate support) disposed in the chamber body;
a movable susceptor drive shaft (shaft) 50 coupled to the susceptor (substrate support) 40 and extending through the aperture 51;

a step formed in an inner surface of the aperture 51 and having a lip formed in the step that is adapted to retain sleeve (guard ring) 93 within the step (Figure 4).

a sleeve (like a substantially annular guard ring) positioned within the step and extending radially inward and upwards toward the shaft 50 (column 9, line 15 to column 12, line 65).

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have a step with a lip as taught by Forster et al in the apparatus of Bennett et al in view of Olsen et al to provide sealing support to the guard ring in the step.

Regarding Claim 3: Foster et al teach the sleeve (guard ring) 93 comprises a base portion having an outer circumference and an inner perimeter, wherein the outer circumference contacts the step and the inner perimeter is adapted for substantially sealing a gap between the shaft and the aperture (Figure 4). Further, Olsen et al also teach the seal 16 (guard ring) comprises a base portion having an outer circumference (defined by tips of ribs 42) and an inner perimeter (defined by tips of ribs 38), wherein the outer circumference contacts the step and the inner perimeter is adapted for substantially sealing a gap between the shaft and the aperture (Figure 2 – Olsen et al).

Regarding Claim 4: Foster et al teach the outer circumference of sleeve (annular ring) 93 is formed as a substantially right angle to a bottom surface of the step (Figure 4).

Regarding Claim 5: Bennett et al in view of Olsen et al teach the outer circumference of seal 16 (guard ring) flares towards platen 9 (substrate support) [Figure 2 – Olsen et al, and Figure 1 – Bennett et al].

Regarding Claim 6: Olsen et al teach the inner perimeter of guard ring (seal 16) is formed as a wedge (Figure 2).

Regarding Claim 7: Bennett et al in view of Olsen et al teach a surface of wedge (Rib 38) slopes upwards to project above the bottom of chamber body (Figure 2 – Olsen et al, and Figure 3 – Bennett et al).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (US Patent No. 5,508,519) in view of Honda et al (US Patent No. 5,873,177).

Regarding Claim 21: Bennett et al teach a semiconductor processing apparatus (Figures 1-3) comprising:

a chamber body (target chamber 1) having an aperture formed in a bottom of the chamber body;

a platen 9 (substrate support) disposed in the chamber body;

a moveable shaft 7 coupled to the substrate support (platen 9), the movable shaft extending through the aperture;

a seal 21 (like an annular guard ring) having a portion extending that slopes radially inward and upwards into sealing contact with the shaft (column 2, line 42 to column 3, line 45).

Bennett et al do not teach guard ring disposed in the aperture. However the seal 21 (guard ring) would necessarily need a structural arrangement for mounting the guard ring on the bottom of the chamber and the same would be a matter of choice (as per example given below) depending upon process related factors like desired level of particle control and space availability for the mounting structure.

Honda et al teach a semiconductor processing apparatus (Figure 5) comprising:

a treating vessel 30 (chamber body) having an aperture formed in a bottom of the chamber body;

a rotor 2 (substrate support) disposed in the chamber body;

a moveable shaft 3 coupled to the substrate support, the movable shaft extending through the aperture;

a sealing mechanism (like an annular guard ring) comprising of sealing cover 7, sealing cylindrical body 7b and bearings 7a, and positioned within the aperture, the guard ring having a portion extending that slopes radially inward and upwards into contact with the shaft 3 (through bearing 7a) [column 8, lines 10-20]. Further, aperture having a step with the guard ring positioned in the step is related to shape, which is a matter of choice and would depend upon process limitations like d control of particles desired.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to mount the guide ring in the aperture as taught by Honda et al in the apparatus of Bennett et al to prevent

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particles on the shaft from reaching near the substrate and thus improve the yield (column 2, lines 30-35 and column 5, lines 5-10).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763